

1 **What is claimed is:**

2 1. A combination of a rotor and a supporting structure for the rotor, the combination
3 comprising:

4 a metal axle tube;

5 a holding member securely mounted in the axle tube, the holding member including a
6 hole and an inner flange formed on an inner periphery defining the hole;

7 a supporting member securely mounted in the axle tube and including a supporting
8 portion;

9 a fixing member securely mounted in the axle tube and including an opening; and

10 a rotor having a shaft provided to a center thereof, the shaft including an engaging
11 groove, the shaft being extended through the hole of the holding member and the opening of
12 the fixing member with an end face of a distal end of the shaft rotatably resting on the
13 supporting portion of the support member and with the fixing member engaging with the
14 engaging groove of the shaft, whereby the shaft and the inner flange of the holding member
15 have a slight contact therebetween.

16 2. The combination as claimed in claim 1, wherein the axle tube includes a hole, and wherein
17 the holding member, the support member, and the fixing member are tightly engaged with an
18 inner periphery defining the hole of the axle tube.

19 3. The combination as claimed in claim 1, wherein the axle tube includes a hole, the holding
20 member and the support member being tightly engaged with an inner periphery defining the
21 hole of the axle tube, the fixing member being sandwiched between the holding member and
22 the support member.

23 4. The combination as claimed in claim 1, wherein the holding member is a ring directly
24 mounted to an inner periphery of the axle tube.

25 5. The combination as claimed in claim 1, wherein the holding member is a ring, the axle tube
26 including an inner periphery having a stepped portion on which the ring rests.

1 6. The combination as claimed in claim 1, wherein the axle tube includes an inner periphery
2 having a stepped portion against which the support member abuts.

3 7. The combination as claimed in claim 1, wherein the support member includes a closed
4 bottom that forms the supporting portion.

5 8. The combination as claimed in claim 1, wherein the supporting portion of the support
6 member includes a hole, further comprising a cover for covering the hole, the end face of the
7 distal end of the shaft rotatably resting on the cover.

8 9. The combination as claimed in claim 1, wherein the fixing member includes an annular wall
9 which abuts against the supporting portion of the support member.

10 10. The combination as claimed in claim 1, wherein the axle tube includes an inner periphery
11 having a stepped portion against which the fixing member and the supporting member abuts.

12 11. The combination as claimed in claim 1, wherein the axle tube includes an inner periphery
13 having a stepped portion against which the fixing member abuts.

14 12. The combination as claimed in claim 1, further comprising a base to which the axle tube is
15 securely mounted, a balance plate being mounted to the base and made from magnetically
16 conductive material, the rotor including a permanent magnet, the permanent magnet and the
17 balance plate attracting each other.

18 13. A combination of a rotor and a supporting structure for the rotor, the combination
19 comprising:

20 a metal axle tube including a ring formed on an inner periphery thereof;

21 a supporting member securely mounted in the axle tube and including a supporting
22 portion;

23 a fixing member securely mounted in the axle tube and including an opening; and

24 a rotor having a shaft provided to a center thereof, the shaft including an engaging
25 groove, the shaft being extended through the ring of the axle tube and the opening of the fixing
26 member with an end face of a distal end of the shaft rotatably resting on the supporting portion
27 of the support member and with the fixing member engaging with the engaging groove of the

1 shaft, whereby the shaft and the inner flange of the holding member have a slight contact
2 therebetween.

3 14. The combination as claimed in claim 13, wherein the axle tube includes an inner periphery
4 having a stepped portion against which the fixing member abuts.

5 15. The combination as claimed in claim 13, wherein the support member includes a closed
6 bottom that forms the supporting portion.

7 16. The combination as claimed in claim 13, wherein the supporting portion of the support
8 member includes a hole, further comprising a cover for covering the hole, the end face of the
9 distal end of the shaft rotatably resting on the cover.

10 17. The combination as claimed in claim 13, wherein the fixing member includes an annular
11 wall which abuts against the supporting portion of the support member.

12 18. The combination as claimed in claim 13, wherein the axle tube includes an inner periphery
13 having a stepped portion against which the fixing member and the supporting member abuts.

14 19. The combination as claimed in claim 1, further comprising a base to which the axle tube is
15 securely mounted, a balance plate being mounted to the base and made from magnetically
16 conductive material, the rotor including a permanent magnet, the permanent magnet and the
17 balance plate attracting each other.